

# CHALMERS



CTH



Course

## CTH BiofuelGS2 course on “Analytical Techniques In Combustion

October 20-24, 2008

Göteborg, Sweden

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### Monday October 20

Time	Place	Subject	Lecturer
08:30-08:45	Linsen	Welcome and introduction	L-E Åmand
08:45-09:30	Linsen	Introduction to gas analysis in boilers	L-E Åmand
09:30-10:00	Linsen	Coffee break	
10:00-10:45	Linsen	On-line measurements of alkali chlorides and the use of deposit probes	Kent Davidsson
10:45-10:55	Linsen	short break	
10:55-11:40	Linsen	Introduction to pressure and flow measurements in boilers	L-E Åmand
11:40-11:50	<sup>1</sup>	Walk to Chalmers lunch restaurant	
11:50-12:40	<sup>1</sup>	Lunch	
12:40-12:50	<sup>1</sup>	Walk back to seminar room Linsen	
		visit to the boiler house on the way back	
12:50-13:30	Linsen	Introduction to FTIR measurements in boilers	L-E Åmand
13:30-14:10	Linsen	Introduction to the use of on-line mass spectroscopy in boilers	L-E Åmand
14:10-14:40	Linsen	Coffee break	“Café Linsen”
14:40-15:30	Linsen	Introduction to temperature measurements in boilers	L-E Åmand
15:30-16:00	Linsen	Follow up of first days lectures, time for questions inquires.	

<sup>1)</sup> Lunch is served at the Chalmers lunch restaurant located in connection to the main entrance to Chalmers

### Tuesday October 21

Time	Place	Subject	Lecturer
08:00-08:15	boiler house	Putting on an overall, leaving bags, outdoor clothes, etc.	
08:15-10:15	boiler house	<i>Practical exercise 1 on the boiler.</i> 3 groups with L-E Åmand Rustan Marberg and Kent Davidsson/Johannes Öhlin	
10:20-12:20	boiler house	<i>Practical exercise 2 on the boiler.</i> 3 groups with L-E Åmand Rustan Marberg and Kent Davidsson/Johannes Öhlin.	
12:20-12:30	<sup>1</sup>	Removal of overall and walk to lunch restaurant.	
12:30-13:30	<sup>1</sup>	Lunch	
13:30-13:45	boiler house	Walk to boiler house, putting on an overall, leaving bags, outdoor clothes, etc.	
13:45-15:45	boiler house	<i>Practical exercise 3 on the boiler.</i> 3 groups with L-E Åmand Rustan Marberg and Kent Davidsson/Johannes Öhlin	
15:45-16:00	base camp	Removal of overall and walk to seminar room Omega	
16:00-17:00	base camp	Follow up of the practical exercises of the day (IACM), questions, results, etc. (bed sample+ cyclone leg (Johannes), fly ashes (Jessica)	

<sup>1)</sup> Lunch is served at the Chalmers lunch restaurant located in connection to the main entrance to Chalmers

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## Wednesday October 22

Time	Place	Subject
08:00-08:15	boiler house	Putting on an overall, leaving bags, outdoor clothes, etc.
08:15-10:15	boiler house	<i>Practical exercise 4 on the boiler.</i> 3 groups with L-E Åmand Rustan Marberg and A
10:20-12:20	boiler house	<i>Practical exercise 5 on the boiler.</i> 3 groups with Johannes Öhlin Rustan Marberg, Kent Davidsson (putting in deposit probe) Jessica Bowhalli.
12:20-12:30	<sup>1</sup>	Removal of overall and walk to lunch restaurant.
12:30-13:30	<sup>1</sup>	Lunch
13:30-13:45	boiler house	Walk to boiler house, putting on an overall, leaving bags, outdoor clothes, etc.
13:45-15:45	boiler house	<i>Practical exercise 6 on the boiler.</i> 3 groups with Johannes Öhlin Rustan Marberg Kent Davidsson (taking out deposit probe) and Jessica Bowalli
15:45-16:00	boiler house	Removal of overall and walk to seminar room Omega.
16:00-17:00	base camp	Follow up of the practical exercises of the day (IACM), questions, results, etc.

<sup>1)</sup> Lunch is served at the Chalmers lunch restaurant located in connection to the main entrance to Chalmers

## Thursday October 23

Time	Place	Subject
09:30-11:20	Linsen	Follow up on practical exercises. Evaluation of data (who does what?). Responsibilities of samples to the next part of the course. Assignment of special tasks for working in minor groups at each universities.
11:20-11:30	<sup>1</sup>	Walk to lunch restaurant "Hyllan" Registration to "Topical meeting"
11:30-12:30	... <sup>1</sup>	Lunch at Hyllan
13:00-	VF	Topical Meeting
19.30	Hyllan	Dinner

1) Lunch is served at the Chalmers lunch restaurant located in connection to the main entrance to Chalmers

Practical exercises 1-6 will we carried out on 2x3 occasions with three groups (I-III) rotating each time. The six exercises (A-F) can be divided into following six "stations":

Name	Person in charge	Meeting place	Content
A	Rustan Marberg	Floor 3	Calibration of total air venturi with pitot tube and turbin wheel meter.
B	Kent Davidsson Johannes Öhlin	Floor 4	Temperature measurements with suction pyrometer Deposit probe.
C	L-E Åmand Johannes Öhlin	FTIR room on floor 3B	FTIR in "EBK2" and "H5CC"
D	Johannes Öhlin Rustan Marberg Kent Davidsson	Control room	Bed samples and cyclone leg samples, deposit rings

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E	Jessica Bowhalli	“base camp” “turbinrummet”	Fly ashes, fuel samples, drying of fuel, TGA (demo)
F	L-E Å	FTIR room on floor 3B	On-line MS in EBK2” and H5CC”

## Group: Members

I	Hau Wu, Muhammad Shafique Bashir, Kavitha Pathmanathan, Daniel Flieg, Daniel Kuehnemu, Stefan Hjærtstam
II	Linda Nørskov, Norazana Ibrahim, Samira Teleschow, Oskar Karlström, Johan Lindholm, Frida Claesson, Pontus Markström
III	Carsten Nørby, Anders Tiedje, Patrycja Piotrowska, Johanna Olsson, Fredrik Lind

## Schedule for the practical exercises:

### Wednesday November 2

Group	Time	“station”	Meeting place
I	08:15-10:15	A	Floor 3
I	10:20-12:20	B	Floor 4
I	13:45-15:45	C	FTIR room on floor 3B
II	08:15-10:15	B	Floor 4
II	10:20-12:20	C	FTIR room on floor 3B
II	13:45-15:45	A	Floor 3
III	08:15-10:15	C	FTIR room on floor 3B
III	10:20-12:20	A	Floor 3
III	13:45-15:45	B	Floor 4

### Thursday November 3

Group	Time	“station”	Meeting place
I	08:15-10:15	D	Control room
I	10:20-12:20	E	base camp, turbinrummet
I	13:45-15:45	F	FTIR room on floor 3B
II	08:15-10:15	E	base camp, turbinrummet
II	10:20-12:20	F	FTIR room on floor 3B
II	13:45-15:45	D	Control room
III	08:15-10:15	F	FTIR room on floor 3B
III	10:20-12:20	D	Control room
III	13:45-15:45	E	base camp turbinrummet